

Lessons from the BattleKings in the Desert

by Major John M. House

Sand as far as the eye could see—with camels, bedouins in pickup trucks, plateaus, villages and heat. Such were the companions of the “Battlekings,” 3d Battalion, 41st Field Artillery (3-41 FA) of the 24th Infantry Division (Mechanized) Artillery while we lived and trained in Saudi Arabia and fought in Iraq. The desert and war were no picnic, but we learned many lessons. The highlights of our experience are in this article so other Redlegs can learn from our trials.

The Battalion Box

The Battalion Box. One significant lesson we learned was the art of moving the battalion in mass during a deep envelopment. When initially faced with the daring Central Command (CENTCOM) plan to launch the 24th Infantry Division north to the Euphrates River valley, we were awed by the scope of the operation. We asked ourselves, “How can we keep up with an armor-heavy brigade attacking across hundreds of kilometers of desert sand, rocks and wadis?”

We knew from three National Training Center (NTC) rotations at Fort Irwin, California, the previous year and months

of training in Saudi Arabia that we’d never be able to keep up if we “leapfrogged” batteries to maintain a continuous artillery umbrella over the Abrams tanks and Bradley fighting vehicles. The “Victory Division’s” 2d Brigade (Vanguard), the brigade we were in direct support (DS) of, was just too fast. It would use speed and the shock action to strike deep and unhinge a defender. But the 2d Brigade Commander also understood the need for fire support. We were determined to find a way not to slow down his attack. The solution was simple and very effective.

We formed a battalion “box” about two kilometers square so the battalion



moved as one entity. (See the figure.) This ensured we always could mass the battalion's fires. We'd stop to shoot only if we encountered a target large enough to warrant firing the entire battalion. By keeping the battalion moving together, we simplified command and control (C²) and survey requirements. We kept up with the maneuver force by remaining in constant contact with our battalion commander riding with the brigade commander and with the task force (TF) fire support officers (FSOs).

This formation also simplified logistics because the battalion trains (i.e., service battery) stayed with the battalion. We left a large signature of tracks in the sand and occupied a large piece of ground. But instead of having to find the support battalion and five separate batteries, our battalion logisticians only had to find and run supplies between the support battalion and our battalion.

Order of Formation. The battalion S3 headed a "Jump TOC" (tactical operations center) of four high-mobility multi-

purpose wheeled vehicles (HMMWVs) that led the battalion and provided tactical fire control. The Jump TOC consisted of the S3 and the S2 in the S3's HMMWV followed by a survey platoon HMMWV carrying an AN/PSN-9 satellite signal navigation set (global positioning system, or GPS) to provide location data. The S3, equipped with an AN/VRC-46 radio, used the battalion command net for C² and monitored the fire support net to track the battle. The survey HMMWV AN/VRC-46 radio remained on the command net.

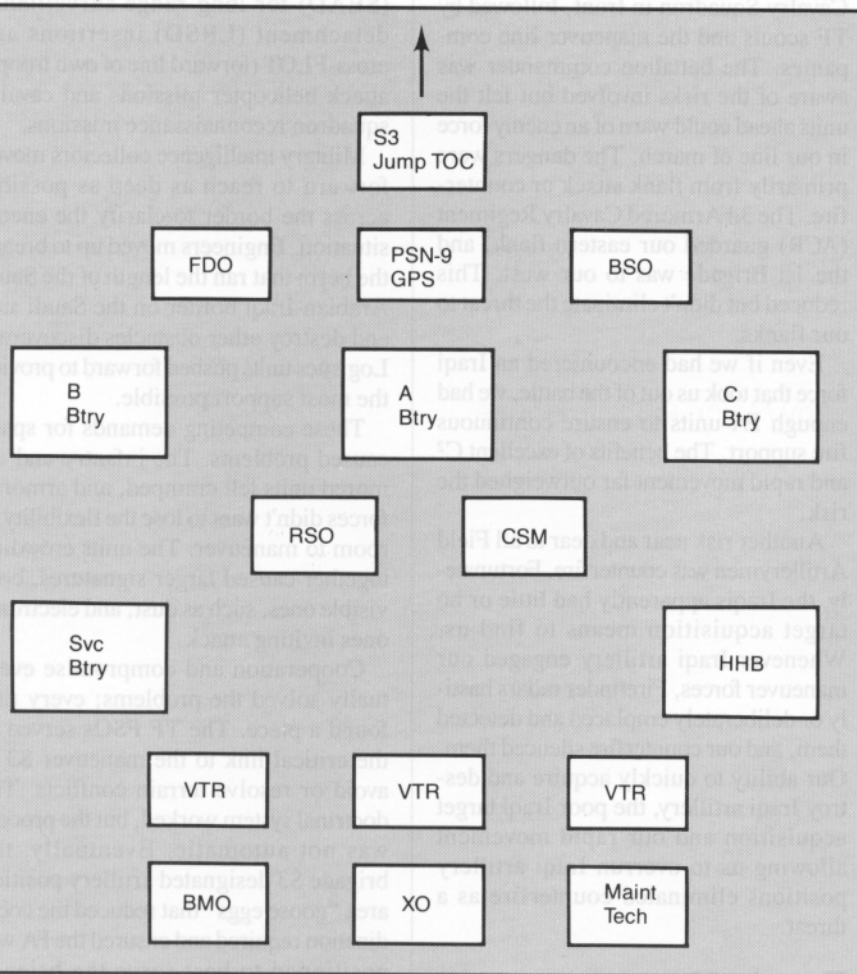
Whenever the S3 needed a battalion position, he only had to say "Grid" on the command net. The survey NCO then responded with the grid. If a failure in satellite coverage occurred, another GPS in the battalion invariably had a grid, though location accuracy was slightly less than that usually achieved. Everyone on the command net immediately knew where he was.

The next HMMWV was the battalion's retrans HMMWV reconfigured as a tactical fire direction center (FDC). The battalion fire direction officer (FDO) and one I3C NCO rode in the back seats with a fabricated plywood mapboard between the rear and front seats. The FDO maintained tactical fire control on the fire support net and stayed in contact with the S3 on the command net. Two communications platoon soldiers rode in the front seats, alternately driving and providing some physical protection in case of a fire fight.

The last HMMWV was a communications platoon HMMWV with two AN/VRC-46s and carried the battalion signal officer (BSO) and a wire team. The BSO radios provided contact with the maneuver brigade on its command net. The second radio remained on the 3-41 FA command net for contact with the S3. The wire team riding in the cargo compartment had a machinegun and provided security for the Jump TOC.

The three firing batteries followed the S3's Jump TOC on line. Battery B was on the left flank and had the battalion's AN/TPQ-36 Firefinder radar attached. Battery A traveled directly behind the Jump TOC with C Battery on the battalion's right flank. The Headquarters and Headquarters Battery (HHB) followed C Battery.

The battalion command sergeant major (CSM) and the reconnaissance and survey officer (RSO) with two position and azimuth determining system (PADS)



The 3-41 FA's Battalion Box Formation for Movement in Desert Storm. The battalion commander rode with the maneuver brigade commander as his fire support coordinator (FSCOORD).



The 3-41 FA BattleKings move toward the Iraqi border.

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vehicles followed the three firing batteries. The CSM provided an experienced set of eyes to evaluate the situation of the three firing batteries and solve problems. The RSO continuously transferred survey control as an alternative to GPS position locations to solve problems with satellite coverage. He also could provide common direction through simultaneous observations and mark routes using standard marking signs, as required.

The battalion TOC M577 command post carriers and the tactical fire direction system (TACFIRE) shelter, on a heavy expanded-mobility tactical truck, (HEMTT) for improved mobility, moved with the HHB. The TOC plans and operations and special weapons officers manned radios in the S3's M577 as a mobile planning and coordination center. The battalion assistant S2 (an unauthorized but very useful diversion of a lieutenant) and intelligence sergeant monitored the 2d Brigade operations and intelligence (O&I) net in the S3 M577. They retransmitted critical intelligence on the 3-41 FA command net.

Service Battery followed B Battery and served as the battalion trains. The battalion administrative and logistics operations center (ALOC) moved with Service Battery. All ammunition HEMTTs were under the operational control (OPCON) of the battalion ammunition officer (BAO) as part of Service Battery. However, each firing battery kept one HEMTT with sufficient rounds for a 400x400 two-aim point, medium density family of scatterable mines (FAS-CAM) minefield on board.

The trail element was the battalion executive officer (XO), battalion motor officer (BMO) and maintenance technician with the three M578 recovery vehicles (VTRs). They served as a maintenance and recovery detachment.

This formation was instrumental in our success and was mission-oriented for our deep strike behind enemy lines. The S3 could see the entire battalion during most of the movement. Although terrain occasionally blocked one battery from view, every battery always could see an adjacent battery for navigational assistance, and the three firing batteries always could see the S3. The size of the formation contracted and expanded as the visibility and terrain conditions dictated.

Rapid movement was possible because the entire battalion stayed together, wasting no time searching for lost bat-

teries. Consolidating the battalion allowed us to capitalize on all battalion logistical elements to rearm, refuel and recover any vehicle in need.

Formation Risks. Certainly there were risks associated with this formation. Had we run into an Iraqi unit in a defensive position or in a counterattack, we could have had the entire battalion in a direct-fire fight. We minimized this risk by staying behind a maneuver unit (at least most of the time) and moving rapidly.

The 2d Brigade had portions of the 2-4 Cavalry Squadron in front, followed by TF scouts and the maneuver line companies. The battalion commander was aware of the risks involved but felt the units ahead could warn of an enemy force in our line of march. The dangers were primarily from flank attack or counterfire. The 3d Armored Cavalry Regiment (ACR) guarded our eastern flank, and the 1st Brigade was to our west. This reduced but didn't eliminate the threat to our flanks.

Even if we had encountered an Iraqi force that took us out of the battle, we had enough FA units to ensure continuous fire support. The benefits of excellent C² and rapid movement far outweighed the risk.

Another risk near and dear to all Field Artillerymen was counterfire. Fortunately, the Iraqis apparently had little or no target acquisition means to find us. Whenever Iraqi artillery engaged our maneuver forces, Firefinder radars hastily or deliberately emplaced and detected them, and our counterfire silenced them. Our ability to quickly acquire and destroy Iraqi artillery, the poor Iraqi target acquisition and our rapid movement allowing us to overrun Iraqi artillery positions eliminated counterfire as a threat.

Terrain Management

Another critical lesson we learned was the difficulty of managing terrain coupled with clearing fires. The maneuver unit owns the space in its area of operations (AO). It bears the responsibility of managing units and the area it occupies. Every unit needing occupation space must coordinate with the maneuver unit that owns that ground. Failure to follow this simple rule causes great confusion and risks fratricide.

Defensive Operations. During the defense, positioning was a special pro-

blem. The desert didn't seem very large when everyone demanded space. Infantry and armor units needed room to maneuver in a defensive framework and engagement areas that maximized the long-range capabilities of anti-armor systems.

Additionally DS, reinforcing (R) and general support (GS) artillery battalions needed positions to allow target attack beyond the frontline maneuver units to support division and brigade deep operations. These operations included scouts, suppression of enemy air defense (SEAD) for long-range surveillance detachment (LRSD) insertions and cross-FLOT (forward line of own troops) attack helicopter missions and cavalry squadron reconnaissance missions.

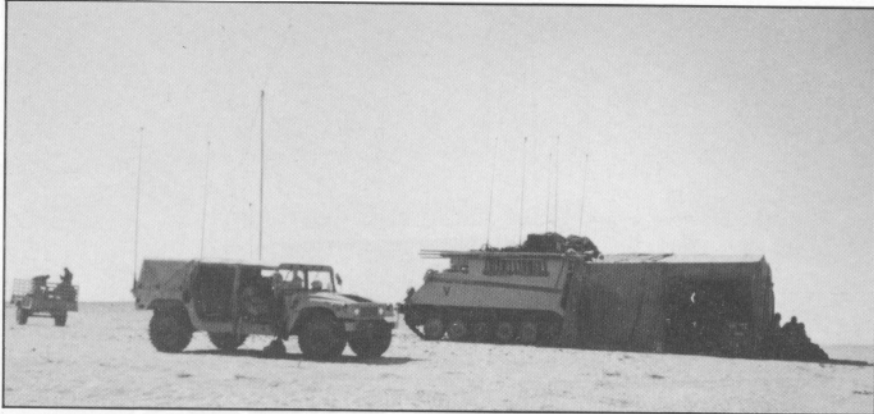
Military intelligence collectors moved forward to reach as deep as possible across the border to clarify the enemy situation. Engineers moved up to breach the berm that ran the length of the Saudi Arabian-Iraqi border on the Saudi side and destroy other obstacles discovered. Logistics units pushed forward to provide the most support possible.

These competing demands for space caused problems. The infantry and armored units felt cramped, and armored forces didn't want to lose the flexibility of room to maneuver. The units crowding together caused larger signatures, both visible ones, such as dust, and electronic ones inviting attack.

Cooperation and compromise eventually solved the problems; every unit found a place. The TF FSOs served as the critical link to the maneuver S3 to avoid or resolve terrain conflicts. The doctrinal system worked, but the process was not automatic. Eventually, the brigade S3 designated artillery position area "goose eggs" that reduced the coordination required and ensured the FA was positioned to best serve the brigade commander.

Offensive Operations. Clearing positions during the offense was much easier. Once the attack started, we rarely stayed on a piece of ground long enough to get into a lengthy discussion over which unit should be positioned where. We oriented on the enemy once we found him, stopping only long enough to fire, attack and collect prisoners. The entire force vacated ground so fast, clearing positions for occupation wasn't a problem.

However, managing terrain to clear fires was another matter. Our rapid



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The 3-41 FA's TOC at Faisal Training Range, Saudi Arabia, in December 1990.

movement made keeping track of every friendly unit location very difficult. Clearing fires, especially across brigade boundaries, was time-consuming and not always exact.

Keeping track of friendly mortars was particularly difficult. More than once our Q-36 radar detected friendly mortars as hostile targets. Due to several quickly developed double-checks on radar acquisitions by the battalion commander, TF FSOs and the battalion FDO, friendly casualties didn't occur. But the opportunity to err and injure friendly troops certainly existed.

Even when we thought we knew where every unit was, the danger of engaging a friendly target was always present. On one occasion, a friendly company moved out of its parent TF sector across the front and into an adjacent TF sector. Scouts initially misidentified the company as a hostile one. Fortunately, "cross talk" identified the company as friendly before casualties occurred.

This problem of tracking friendly units and clearing fires is one we must address. The desert battlefield was non-linear, a battlefield we'll encounter in the future. The division's deep attack made us have to be prepared to fight in any direction. As units maneuver at will across a battlefield and a frontline becomes impossible to plot, tracking units and the size and shape of the space they occupy is essential if we're to clear fires. Failure to clear fires will guarantee fratricide.

Gunnery Issues

Several gunnery issues also require comment. Accurate, predicted fire is a prime component of FA support. Massed fires reduce the enemy's reaction time compared to engaging him with adjust-fire missions. It also reduces the time needed to attack a target.

Time versus Absolute Precision. Intentional or not, the desire for absolute accuracy has, at times, driven artillery-

men into such a frenzy that timeliness suffers. The tradeoff between a minimal increase in accuracy while adding one or more minutes to the processing time makes the additional accuracy not worth the time. The slower time for GS units firing a preparation or for a time-on-target or at-my-command mission may be appropriate, but a DS battalion can't afford the extra time. Infantry and armored units want steel on the target *now* rather than "the world" later, after the critical moment has passed.

FA cannons are area-fire weapons. Yet today we demand individual howitzer data to shoot a tight, converged sheaf. We have junior officers who believe their training teaches them to demand a PADS grid for every howitzer or they shouldn't shoot. This just isn't true. Battery center (a term some junior officers have difficulty understanding) and one deflection and quadrant for all howitzers to shoot works. It has for years, including in Iraq.

We realized that accurate fire was essential. We also realized we'd never have the time to rely on more than a battery center grid and one deflection and quadrant. Therefore we focused our training on battery operations and firing a standard battery sheaf, which worked extremely well.

We used GPS to obtain a grid and our aiming circles to determine magnetic direction. We continually prepared and executed simultaneous observations and declinated our aiming circles as time in position allowed. We brought forward PADS data and, eventually, updated it off our GPSs. This location and direction accuracy was sufficient. We repeatedly engaged targets with battalion fire-for-effect missions. Invariably, the targets were so large (airfields, ammunition storage areas and division defensive positions) we used multiple aim points to engage the enemy positions.

Battery-Based Operations. We also operated exclusively as batteries during Desert Storm—not platoons. This simplified C² and provided key leader redundancy: two sets of battery XO's, platoon leaders, FDO's and FDC's, chiefs of firing battery and gunnery sergeants. The redundancy made 24-hour operations feasible and provided replacements if casualties had made them necessary.

Virtually every mission was a battalion hasty occupation. The S3 commanded "Battalion occupy, azimuth of fire xxxx." The battalion halted immediately, oc-



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The BattleKings move near Basra, Iraq, in March 1991.

cupied and shot according to the battalion FDO's fire order. This worked and provided rapid response to calls for fire.

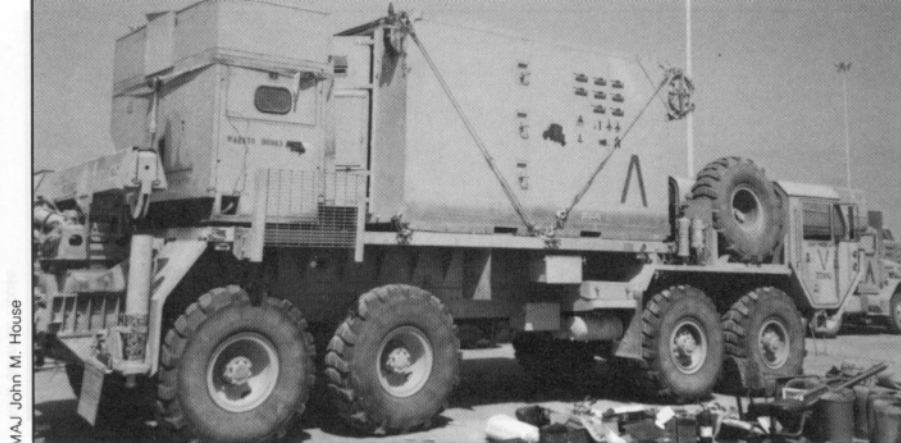
To execute this plan, we conducted numerous rehearsals. Batteries held "walk-throughs" with drivers and key leaders as well as sand table discussions and battery movement exercises. The brigade FSO and the battalion FDO held countless fire support rehearsals. The battalion commander and S3 rehearsed battalion and battery actions with battery officers and the battalion staff time and again. Rehearsals were critical to our preparation for war.

Navigational Aids for the Fire Support System. Each of our fire support teams (FIST) and firing batteries had access to a GPS through either FA or maneuver distribution. The survey platoon had two. These devices were essential because obtaining accurate location was difficult, at times impossible, in the desert.

Navigation aids must be available for all key leaders and components of the fire support system. Their accuracy supports accurate, predicted fires, the train-up is simple and the systems are available now at a reasonably inexpensive cost.

Battalion Meteorological Sections. To ensure up-to-date weather data, each DS battalion had a meteorological (Met) section attached. Users needing Met support only had to contact one of the forward deployed Met sections with the requirements. We flew Met balloons on a flexible schedule, based on the weather, our movement plan and the tactical situation. The Met section moved with the battalion FDC and responded directly to the needs of the battalion S3 and FDO.

Chronograph Maintenance. Before the war, we could get muzzle velocity data while firing at the division's range complex in Saudi Arabia. The M90



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The 3-41 FA's FDC mounted on a HEMTT stops in Saudi Arabia in March 1991.

chronographs proved their worth; however, maintenance problems left us with only three of our six M90s operational. In this case, more is better. Authorizing one per howitzer would, of course, make getting muzzle velocities that much easier and ensure continuous updates during combat operations.

Vehicle Recommendations

Several vehicle lessons learned warrant discussion. Our battalion had some mobility problems, lacked some important haul capabilities and had some maintenance problems.

HEMTT TACFIRE Shelters. A 5-ton truck carrying the battalion FDC isn't a good vehicle for much cross-country or desert movement. The FDC must be able to go anywhere the TOC M577s can go and at the same speed.

We solved this problem by mounting the TACFIRE shelter and one 15-kilowatt generator on a HEMTT, which towed the second 15-kilowatt generator. We hesitated to do this because of the loss of HEMTT ammunition hauling and the

need to retrain the FDC section on maintaining a new vehicle. But several other FA battalions mounted their TACFIRE shelters on HEMTTs, and it worked well for them. Looking back, this diversion of a HEMTT was a wise decision because of the increase in mobility it provided. The HEMTT is a "workhorse." We need more to carry cargo and for their cross-country mobility. Expecting a 5-ton truck to carry a TACFIRE shelter and keep pace with maneuver elements in the desert is expecting too much.

Common Vehicle for FA TOC Elements. Related to the FDC vehicle problem is another C² issue. The battalion S3, S2 and FDC (in other words, the TOC) should be in the same type of vehicles. The battalion S3 is the TOC officer in charge (OIC). He must ensure the battalion is positioned to deliver fires in an accurate, timely manner. The S3 and S2 M577s serve as "the heart" of battalion planning and operations. However, separating the FDC from the rest of the TOC because a TACFIRE shelter can't physically plug into a M577 extension encourages the S3 to ignore (or at least neglect) one operation. The



A 3-41 FA battery moves in a wedge formation across the Saudi desert.

DPICIRE's remote communications monitoring unit (RCMU) doesn't keep the S3 or TOC shift officer abreast of the delivery of fires.

All TOC elements must be in vehicles that facilitate the S3, section OICs and section NCOICs meeting for quick updates. Having a "feel" for the battlefield is important for leaders to make proper decisions. Hearing the radio traffic, seeing each section's maps, looking at the faces of those in each TOC element—these are essential. War is part art and part science. The art requires human interaction. Our battalion TOC layout should help, not hinder, this interaction.

The ideal solution would be a new C² vehicle (wheeled or tracked) with the cross-country mobility of the maneuver units we support. Current combat developments studies are working to provide a common chassis for multiple vehicles in the Armored Systems Modernization (ASM) Program. That effort should include putting the FA TOC elements in the same vehicles.

Fuel Tankers. Our three HEMTT fuel tankers didn't provide enough fuel haul capacity. The rapid movement and decision to attack a day ahead of schedule stretched our logistics capability to the limit.

At one point, the lack of fuel almost forced us to stop moving or give the fuel only to the howitzers. Fortunately, we received fuel, but a little "safety margin" would have relieved a lot of pressure on the battalion leadership and logisticians. One additional tanker per howitzer battery is a must. The six tankers per battalion would ensure fuel resupply for sustained combat operations.

Decontamination Vehicle. For hasty decontamination, water was a constant source of concern. We resolved this by leasing two civilian flatbed trucks, each carrying two 200-gallon water tanks. We mounted an M17 lightweight decontaminating apparatus (or Sanator) on each to make mobile chemical decontamination vehicles. Unfortunately, those vehicles didn't make the trip back to Fort Stewart, Georgia. The battalion doesn't have sufficient cargo haul capacity to carry the Sanators or water for hasty decontamination.

If we're serious about decontamination in mobile armored warfare, we better produce a battalion decontamination vehicle. A simple fix would be commercial flatbed or side-panel 4x4 trucks for units to carry Sanators and water tanks or blivits.

M548 Ammo Carrier Replacement. The M548 was a unique challenge. Six months in the desert reaffirmed that our M548s were incapable of performing their mission. They couldn't consistently carry 96 rounds and keep up with M109A2 howitzers without experiencing severe maintenance problems. Reducing the M548 load to 56 rounds (seven pallets) significantly increased its operational readiness rate and helped it keep up with the battalion.

Intense maintenance and this reduced load resulted in the battalion's 24 M548s completing the 370-kilometer attack with no breakdowns. However, the additional maintenance and the extra burden on the HEMTTs call for replacing the 548s; HEMTTs would make excellent ammunition carriers.

HMMWV Maintenance. We found the HMMWV to be a reliable, sturdy vehicle with superb mobility. However, the rough terrain caused the generator mounting bolts to break, steering gearbox seals to leak and tires to flatten. The first two problems might be solved with more durable parts. The flat-tire problem could be solved by providing a spare tire mounted on a rim for all HMMWVs.

Many of our HMMWVs carried spare tires tied to 4x8 sheets of plywood on the tops of the vehicles, but we didn't have rims for most of the spares. We also carried extra cargo on the plywood, which significantly increased our HMMWVs' haul capacity.

"Dirty Battlefield"

Munitions that contain bomblets were a hazard to friendly troops. Dual-purpose improved conventional munitions (DPICM), multiple launch rocket system (MLRS) and Air Force cluster bombs left a dirty battlefield although only a small percentage of their sub-munitions were duds. We drove through areas previously hit by such munitions several times. Firing rounds with sub-munitions was a conscious risk because we wanted to achieve the effects possible from such weapons. Two of our howitzers and one M548 ran over duds that detonated and caused minor damage.

Several soldiers in the theater were injured when they handled the duds or accidentally stepped on them. Most maneuver personnel had never considered this potential hazard. Pre-war discussions and rehearsals brought the hazard to their attention. The obvious

result is that DPICM might not be an appropriate shell choice for certain operations where high-explosive (HE) or Copperhead rounds can achieve the same results without leaving a dirty battlefield.

Chemical Protection

The last problem is wearing chemical protective overgarments (CPOGs). Concern over chemical attacks prompted our donning CPOGs before the air war began and then replacing them with our second suit when the ground war began. We stayed in mission-oriented protective posture gear (MOPP) Levels I or II for 59 days. We experienced the obvious discomfort of wearing the same outer garment for weeks, but one characteristic of the CPOG should change. We must modify the CPOG's charcoal lining so it won't rub off on the wearer. Daily showers weren't possible, and the charcoal coating made a bad situation worse. The good point was that we learned it was possible to wear CPOGs for 59 days.

The Most Important Lesson

There were other lessons that we and other artillerymen learned. They'll fill the pages of many editions of our Bulletin. Certainly some of our lessons were situation dependent. War in Europe or the Far East wouldn't be exactly like war in the desert. A more resolute enemy also would have made a profound difference.

All of us must learn from Desert Storm but be smart enough to selectively apply the lessons. With well-trained soldiers, good equipment and doctrine as a guide, We must select the appropriate course of action for each combat situation. That may well be the most important lesson of Desert Storm.



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